Question	Answer	Marks	Guidance
1 a	Type 1 **and** a correct reason Type 1 is insulin dependent/early onset/juvenile (1) Type 1 doesn't produce any/enough insulin (1) Type 2 can be controlled with diet only (1)	1	Type 2 / Type A / Type B = 0 **allow** Type 1 **has to be** controlled by injecting insulin / she **needs** insulin **ignore** she injects insulin (in the stem of the question) / she uses insulin **allow** pancreas doesn't work **allow** Type 2 is late onset / associated with obesity Jessica is neither / Type 2 not insulin dependent
b	insulin dose would be less /decreases (1) because she would use up **blood** sugar / glucose (1)	2	 **ignore** sugar / glucose unless clearly linked to blood
	Total	**3**	

Question			Answer	Marks	Guidance
2	(a)		**[Level 3]** Explains implications of all **three** conditions, at least one of them in detail **and** at least one **calculation** that indicates the number of people that may be involved. Quality of written communication does not impede communication of the science at this level. **(5–6 marks)** **[Level 2]** Explains implications of **two** conditions **and** at least one **calculation** that indicates the number or a **calculated** percentage of people that may be involved **or two** conditions at least one of them in detail. Quality of written communication partly impedes communication of the science at this level. **(3–4 marks)** **[Level 1]** Explains implications of at least **one** condition. Quality of written communication impedes communication of the science at this level. **(1–2 marks)** **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. **(0 marks)**	6	**This question is targeted at grades up to A.** **Indicative scientific points at level 3 may include:** • plaque formation/fatty deposits in the coronary arteries can lead to reduced blood supply to heart muscle / lack of oxygen and or glucose to heart muscle / thrombosis • high blood pressure is linked to (an increased risk of) thrombosis / strokes / kidney damage • **allow** Type 2 diabetes causes kidney damage / blindness / poor circulation / ulcers **Indicative scientific points at level 1, 2 may include:** • too much cholesterol in the blood can form plaques in the walls of arteries **ignore** high blood cholesterol is linked to (an increased risk of) heart disease (low demand) • failure to respond to insulin is failure to control blood sugar levels / Type 2 diabetes • **ignore** failure to respond to insulin is diabetes (low demand) **Indicative scientific points at level 1 only:** • high blood pressure is linked to (an increased risk of) heart disease / heart attack • **allow** 1 mark for correct calculation only with no other explanations **example** of calculations • 30 000 people in Singapore have all three conditions (or similar calculation) • 330 000 have high blood pressure only • 68% have a single condition • 60% have at least one heart related / circulatory disease **Use L1, L2, L3 annotations in scoris; do not use ticks.**

Question			Answer	Marks	Guidance
	(b)		29% have two of the conditions only but we do not know which two (1)	1	**allow** some people have two conditions but we don't know which one
			Total	**7**	

Question			Answer	Marks	Guidance
3	(a)		<table><tr><th>part of the kidney</th><th>letter</th><th></th></tr><tr><td>cortex</td><td>E</td><td></td></tr><tr><td>medulla</td><td></td><td></td></tr><tr><td>renal artery</td><td>(A)</td><td></td></tr><tr><td>renal vein</td><td>B</td><td></td></tr><tr><td>ureter</td><td></td><td>(2)</td></tr></table>	2	3 or 4 correct (2) 1 or 2 correct (1)

Question			Answer	Marks	Guidance
	(b)		**(Level 3)** Explains the role of ADH in controlling the amount of water removed in urine **and** how alcohol affects the action of ADH. Quality of written communication does not impede communication of the science at this level. **(5–6 marks)** **(Level 2)** Explains the role of ADH in controlling the amount of water removed in urine. Quality of written communication partly impedes communication of the science at this level. **(3–4 marks)** **(Level 1)** Gives a simple description that the **kidneys** remove **excess** water. Quality of written communication impedes communication of the science at this level. **(1–2 marks)** **(Level 0)** Insufficient or irrelevant science. Answer not worthy of credit. **(0 marks)**	6	**This question is targeted at grades up to A*** **Indicative scientific points at level 3 includes level 2 points plus** • explains that alcohol causes even more water to be lost / even less reabsorbed. **ignore** alcohol reduces ADH (in question) **Indicative scientific points at level 2 may include:** • ADH increases the amount of water reabsorbed / reduces amount lost in urine • less ADH decreases the amount of water reabsorbed / increases amount lost in urine • ADH increases permeability of kidney tubules so more water is reabsorbed back into the blood • increased water in blood reduces the amount of ADH **Indicative scientific points at level 1 may include:** • kidneys remove **excess** water (to form dilute urine) • kidneys reabsorb less water. **ignore** drinking more water/beer increases volume of urine **ignore** drinking more water/beer makes urine more dilute (in question) **allow** level 1, 2 marks max for drinking alcohol causing more dilute urine than drinking water (no mention of ADH) **Use L1, L2, L3 annotations in scoris. Do not use ticks**.

Question			Answer	Marks	Guidance
	(c)		genetically identical / tissue match (1) (twins/kidneys) are same age / size (1)	2	**allow** no risk of rejection **but ignore** less risk of rejection **allow** same genes / DNA / chromosomes **not** similar genes / tissue **ignore** references to blood group **allow** similar size
			Total	**10**	

Question	Answer	Marks	Guidance
4 a i	A = ureter (1) B = cortex (1)	2	**allow** phonetic spelling **not** urethra
ii	to filter (the blood) (1)	1	**allow** molecules / substances are forced out (of blood) **allow** ultrafiltration **ignore** just remove waste
b	percentage working decreases over time / ORA (1) less points / A grade will have a greater chance of still working / lasting longer / ORA (1)	2	**ignore** just negative correlation **allow** correct comparison e.g. A and B last longer than C and D **allow** converse answers **ignore** actual data on its own
c	7% (difference) (2) BUT Manjit grade B/79% and Georgina grade C/72% (1)	2	**allow** answers written by table
	Total	**7**	

Question	Answer	Marks	Guidance
5	**[Level 3]** Answer describes the range of movement at the hip AND describes the consequence(s) of damaged cartilage / synovial fluid Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Answer describes the range of movement at the hip AND gives simple description of the damage Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Answer describes the range of movement at the hip OR gives simple description of the damage. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at D to A** **Indicative scientific points may include:** Consequences: • less **synovial** fluid means less lubrication / more friction • less/damaged cartilage means more friction/less shock absorption Simple description of damage: • less (synovial) fluid • less cartilage / cartilage is wearing away • bones rubbing together / bone pushed into socket Range of movement: • allows movement in three planes / almost 360° / all directions if just 'hip joint is a ball and socket joint' limits mark to L1, 1 mark or L2, 3 marks **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
	Total	**6**	

Question			Answer	Marks	Guidance
6	(a)		**[Level 3]** Explains more than one method to avoid overheating to include explanation that the frill retracts during hot part of day to reduce **SA/V**. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Explains more than one method to avoid overheating to include one method **specific** to the lizard. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Explains at least one method to avoid overheating. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to A** **Indicative scientific points at Level 3 to include:** • lowers/closes frill to reduce (exposed) surface area to volume ratio to reduce heat gain. **ignore** raises/opens frill to increase SA/V to increase heat loss **unless** it is made clear that this happens in a cool place for a L3 standard response about reduced SA/V that only includes this one method, award L2, max 4 marks **Other indicative scientific points may include:** methods specific to lizard: • alternate lifting up of feet • lower/closes frill to reduce (exposed) surface area • open mouth (to increase heat loss). **ignore** raises/opens frill to increase SA to increase heat loss **unless** it is made clear that this happens in a cool place **ignore** use of frill as a fan **generic methods**: • find shade / hide in holes • go in water • stay still (to avoid overheating). if no other marks awarded, then award **max 1** for simply 'lower/close frill' or 'go under rock' (with no explanation) **ignore** vasodilation / vasoconstriction **ignore** drinking / sweating

Question			Answer	Marks	Guidance
	(b)		**any three from:** genetic variation is limited / reduced gene pool (1) predators / habitat loss still present (1) captive breeding avoids having to collect the young iguanas from habitat (1) may not breed well in captivity (1) idea that more iguanas will be released (because young more likely to survive in captivity) (1) animals raised in captivity may not survive well when released (as don't have experience of living in the wild) **or** young/small animals released in to wild are less likely to survive (than larger ones released by headstarting) (1)	3	answer must refer to captive breeding **ignore** inbreeding / small number of adults **ignore** 'more young produced' 'animals raised in captivity don't survive when released because they are being eaten (by animals) / are prey' =1, but **does not** gain the predator mark (point 2) as well, unless the presence of predators/cats/dogs is explicitly mentioned, which gains 2nd marking point
			Total	**9**	

Question			Answer	Marks	Guidance
7	(a)		(at high temperatures) **more** water is lost cooling down the insect (1)	1	**allow more** water is lost and evaporation takes heat from the insect **ignore** sweating
	(b)	(i)	parasite (1)	1	**mark the answer line first** **allow** correct answer circled, underlined or ticked more than one answer = 0

Question			Answer	Marks	Guidance
		(ii)	**Level 3 (5–6 marks)** Includes an explanation of natural selection with reference to the genetic basis of the variation of the cricket and the increase in the number of silent cricket **and** the mechanism for speciation is explained with correct reference to crickets because the two types of crickets are less likely to mate. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** Includes an explanation of natural selection **or** the mechanism for speciation with correct reference to crickets. Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks)** Some use of natural selection **or** speciation to explain the changes. Quality of written communication impedes communication of the science at this level. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to A*.** **Indicative scientific points at level 3 may include:** • the existence of silent crickets is genetic / controlled by genes • the silent crickets are more likely to survive and pass on their genes as their larvae are less likely to be parasitized • the silent crickets are less likely to mate with the singing crickets • singing crickets get killed off so reduced chance of mating • as there is less mixing of genes, two different species may form **Indicative scientific points at level 2 may include:** • explanation of natural selection linked to crickets • variation in some crickets singing some not • silent crickets higher survival value • idea of isolation of cricket affecting reproduction leading to new species forming **Indicative scientific points at level 1 may include:** • idea of natural selection explaining the changes in generic terms • idea of isolation leading to new species forming in generic terms **Use the L1, L2, L3 annotations in Scoris. Do not use ticks.**
			Total	**8**	